

Chocolay Township

Signalized intersection locations on US-41/M-28 with crash summaries and collision diagrams for the years, 2000, 2001 and 2002.

	Total Crashes
US-41 at M-28 Junction and Cherry Creek Road	23
US-41/M28 at Silver Creek Road	21

US-41/M-28 & Cherry Creek Road

US-41 (south leg) and M-28 (east leg) merge at this location. The north leg (combined US-41 and M-28) and the south leg of the intersection are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW ONLY” markings with solid yellow-skip yellow lane lines. There is curb, gutter, and asphalt pathways on both sides of the north and south legs. US-41 transitions to a two-lane roadway south of the intersection.

The east leg (M-28) has a short 100-foot long right turn lane marked at the intersection with a long taper. There are no “RIGHT LANE MUST TURN RIGHT” signs.

The west leg (Cherry Creek Road) has three lanes at the intersection including a 150-foot long left turn lane. Cherry Creek Road transitions to a two-lane roadway west of the intersection. The pavement markings on the west leg are faded.

The posted speed limits are 45 MPH on the north leg, 55 MPH on the south leg, 45 MPH on the west leg, and 55 MPH on the east leg.

The intersection is controlled by a semi-actuated traffic signal. There is a lagging protected Left Turn Green Arrow (LTGA) on the northbound and southbound approaches that is displayed simultaneously with a leading Right Turn Green Arrow (RTGA) on the westbound approach. There are detector loops in all the northbound and southbound approach lanes. Therefore the northbound and southbound approaches operate full-actuated. The loop locations are delineated with hand applied white paint which is not a standard practice.

There are no detector loops in either the eastbound or westbound approach lanes. Therefore the east-west traffic signal phase operates as fixed time.

There are no pedestrian indications or crosswalks at the intersection. There are STOP lines marked on all approaches.

Observations reveal that the major turning movements at the intersection are the southbound to eastbound left turn and the complementary westbound to northbound right turn. Conversely the northbound to westbound left turn volume is relatively light.

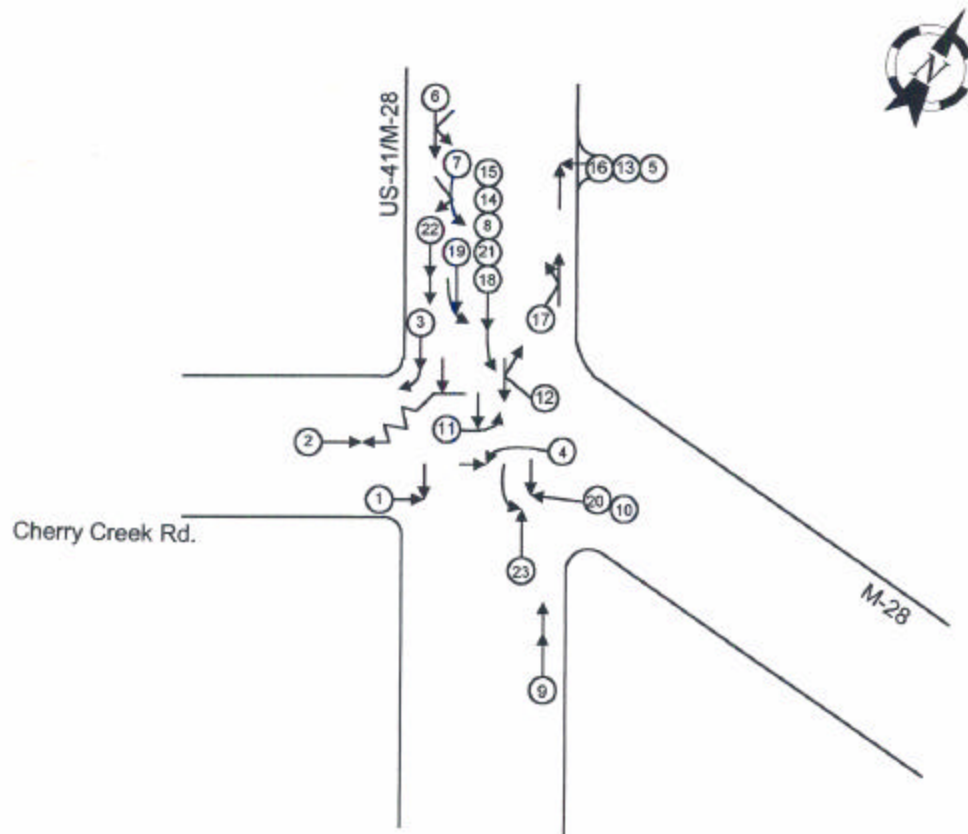
Therefore the southbound thru-right signal phase often operates simultaneously with the southbound left turn phase.

Crash Review Comments

Of the 23 crashes, 9 were southbound to eastbound left-run collisions. An intersection operations study is recommended to provide safer left-turn opportunities.

US-41/M-28 at M-28/Cherry Creek Rd
Chocolay Twp., Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/29/00	2350	PD	Rt A	2	S-E	Wet
2	5/5/00	2347	1-B,1-C,1-A	Rt A	3	E-S-W	Dry
3	5/22/00	0705	PD	RT RE	2	S	Unk
4	8/24/00	2130	Unk	Hd on LT	2	E-W	Dry
5	10/06/00	1245	PD	Dr' Angle	2	W-N	Dry
6	12/08/00	2230	PD	SS SM	2	S	Unk
7	12/14/00	1730	PD	LT SS SM	2	S	Unk
8	1/05/01	0745	1 - C	RE LT	2	SE	Wet
9	1/05/01	1145	PD	RE	2	NE	Snowy
10	1/19/01	1035	PD	Angle	2	SW-NW	Snowy
11	2/02/01	1935	PD	LT Angle	2	W-NE	Icy
12	3/10/01	1845	PD	Rt Angle	2	W-SE	Snowy
13	3/29/01	1215	PD	Dr' Angle	2	NE -SW	Dry
14	7/15/01	1100	1 - C	RE LT	2	SE	Wet
15	7/28/01	1155	PD	RE LT	2	SE	Wet
16	2/03/02	1540	PD	Dr' Angle	2	NE-SW	Snowy
17	3/03/02	1310	PD	RE	2	NE	Snowy
18	7/26/02	1800	PD	RE LT	2	SE	Dry
19	8/11/02	1050	PD	LT SS	2	SE	Dry
20	11/10/02	0005	PD	RE	2	SE - NW	Wet
21	11/24/02	1455	PD	RE LT	2	SE	Dry
22	11/30/02	1935	PD	RE	2	SE	Icy
23	12/07/02	0045	1 - C	Hd on LT	2	SE - NW	Wet



Three years of Collisions - 2000 thru 2002

23 Total Collisions - 18 Property Damage, 4 injury, 1 Unk
 9 Left Turn related (SBd to EBd), 5 Rear Ends, 1 Head-on
 Left Turn, and 3 Side swipe

US-41/ M-28, and Silver Creek Road/Corning Street

The north and south legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb and gutter on both sides. There is an asphalt pathway on the east side only.

There are no pavement markings on the east leg (Corning Street). The westbound approach curves to the right and operates as a single wide lane at the intersection.

The west leg (Silver Creek Road) has two short approach lanes delineated only by hand painted detector loops. There are no other pavement markings. There is an overhead illuminated sign with “Left Arrow Only” legend. An access driveway to the Township offices is located on Silver Creek Road just 75 feet from the intersection.

The posted speed limits are 45 MPH on the north leg and south legs, and 25 MPH on the west leg. The speed limit on the east leg is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase semi-actuated traffic signal. There are detector loops on the side streets only.

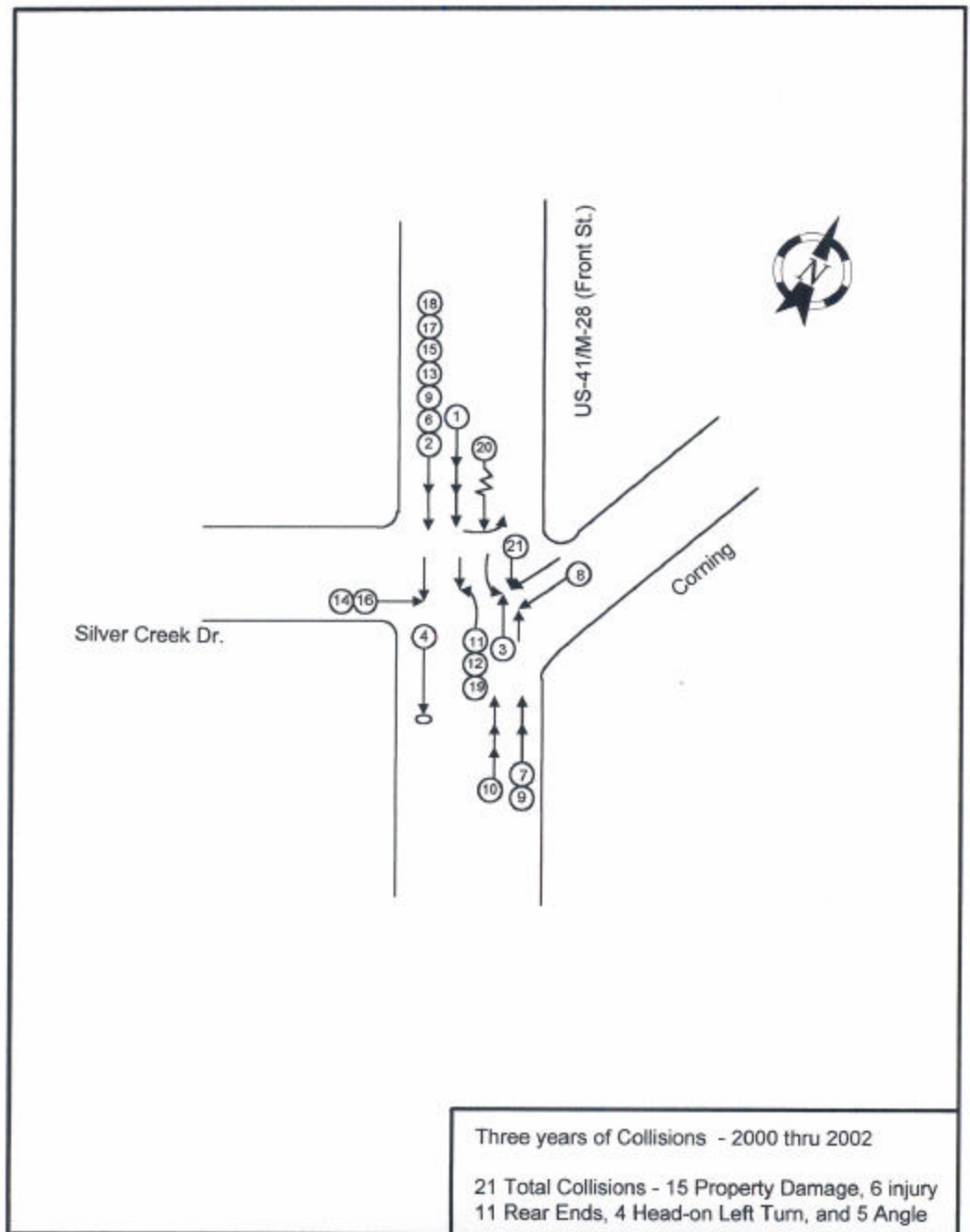
There are no pedestrian indications or crosswalks at the intersection. There are STOP lines marked on the northbound and southbound approaches only.

Traffic queues were observed on Silver Creek Road during the AM peak period. Complaints have been received from the Township relating to driveway access during the AM peak period.

There is an overhead pedestrian bridge on the north leg of the intersection. The bridge may obscure the view of the traffic signal indications for drivers of buses and trucks when approaching the intersection in the southbound direction.

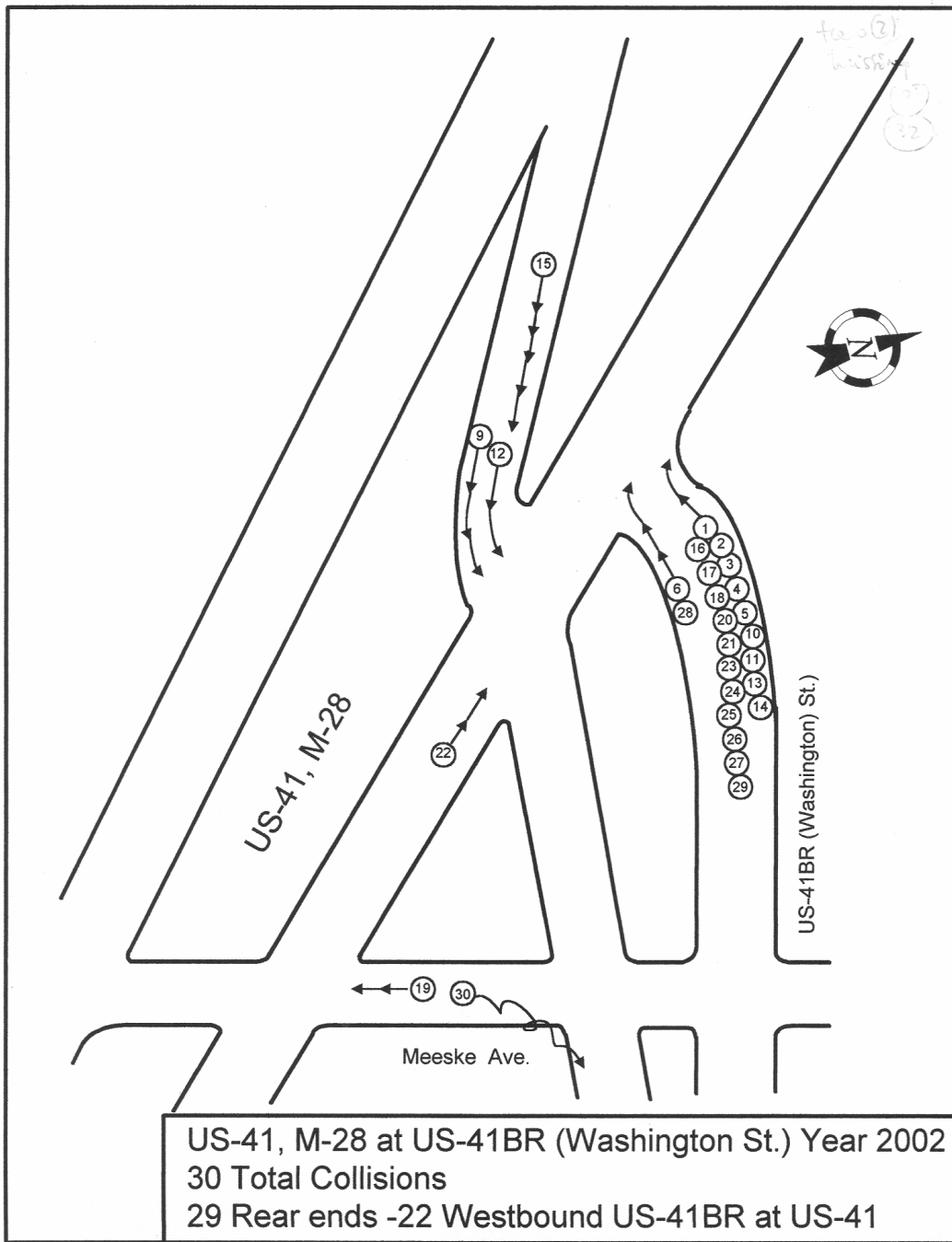
Crash Review Comments

Eight of the 21 crashes were southbound rear ends, 5 were angle and 4 were head on left turn crashes. Visibility of the signal is questioned by the local agency. Improved clearance intervals may reduce left turn crashes.



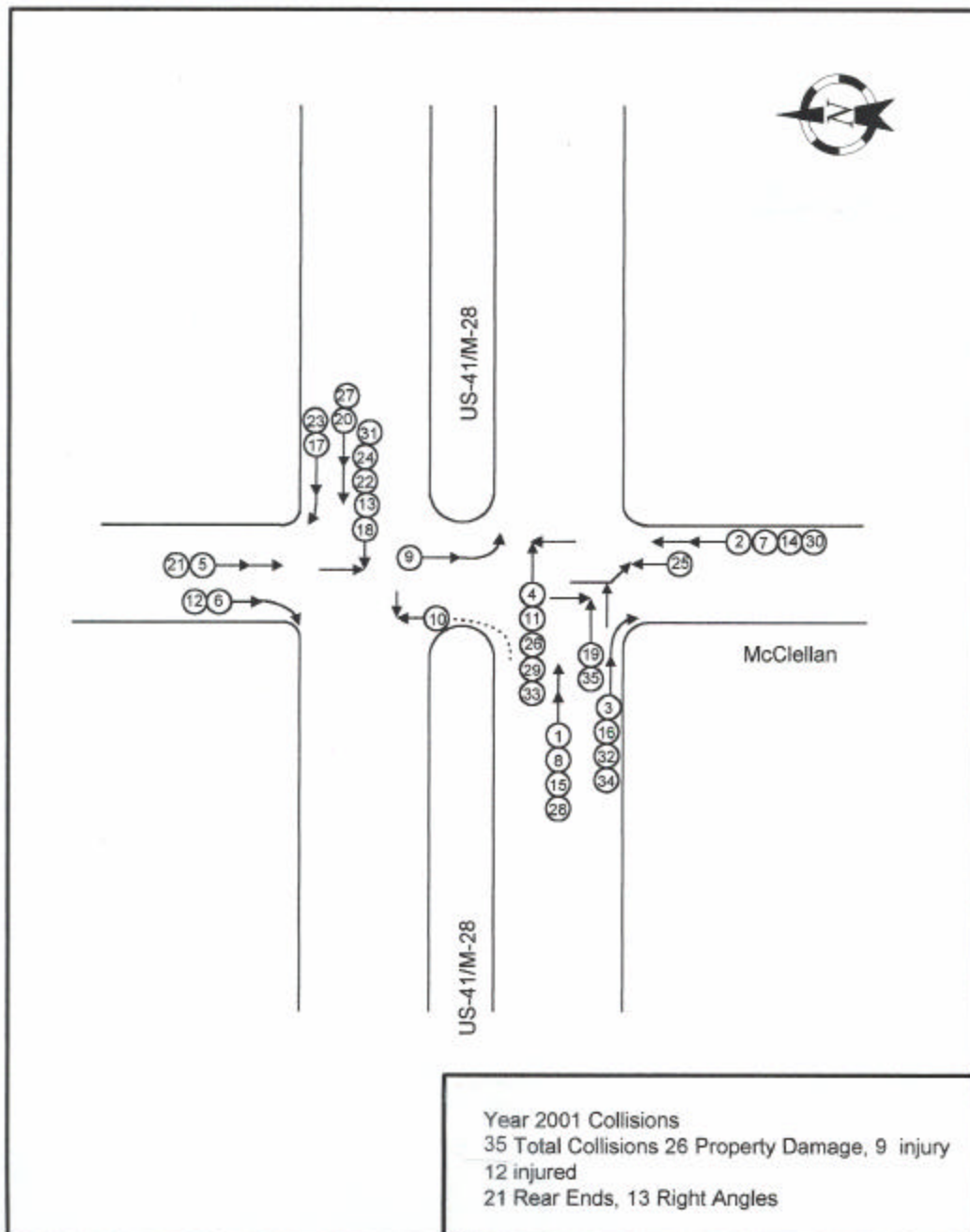
US-41/M-28 at Silver Creek Rd
 Chocolay Twp., Marquette County
 Years 2000, 2001 & 2002
 Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition	Remarks
1	3/24/00	1700	PD	RE	3	S	Wet	Raining
2	6/14/00	0855	PD	RE	2	S	Unk	
3	6/17/01	1400	PD	Hd on Lt	2	N - S	Dry	77 yr old driver
4	7/07/01	1045	PD	Misc	1	S	Dry	Obj thrown from Rdwy
5	8/13/01	1835	1 - C	RE	2	N	Dry	
6	9/07/01	1800	PD	RE	2	S	Dry	
7	10/16/01	1020	1 - C	RE	2	N	Wet	Raining
8	2/06/02	1905	PD	Angle	2	N - W	Dry	
9	3/01/02	1650	PD	RE	2	S	Dry	
10	3/12/02	1721	PD	RE	2	N	Dry	
11	5/18/02	1240	1 - C	Hd on LT	2	N - S	Dry	
12	5/20/02	1550	PD	Hd on LT	2	N - S	Dry	
13	5/29/02	1635	PD	RE	2	S	Dry	
14	7/06/02	1210	1 - C	Angle	2	N - W	Dry	
15	7/11/02	1638	PD	RE	2	S	Dry	Construction Zone
16	9/14/02	1720	PD	Angle	2	S - E	Wet	Raining
17	9/26/02	0930	1 - A	RE	2	S	Wet	Raining
18	10/30/02	1330	PD	RE	2	S	Wet	Raining
19	11/11/02	0910	PD	Hd on LT	2	N - S	Wet	
20	12/18/02	1430	PD	Angle	2	S - E	Wet	Raining
21	12/19/02	1100	1 - C	Angle	2	S - W	Wet	



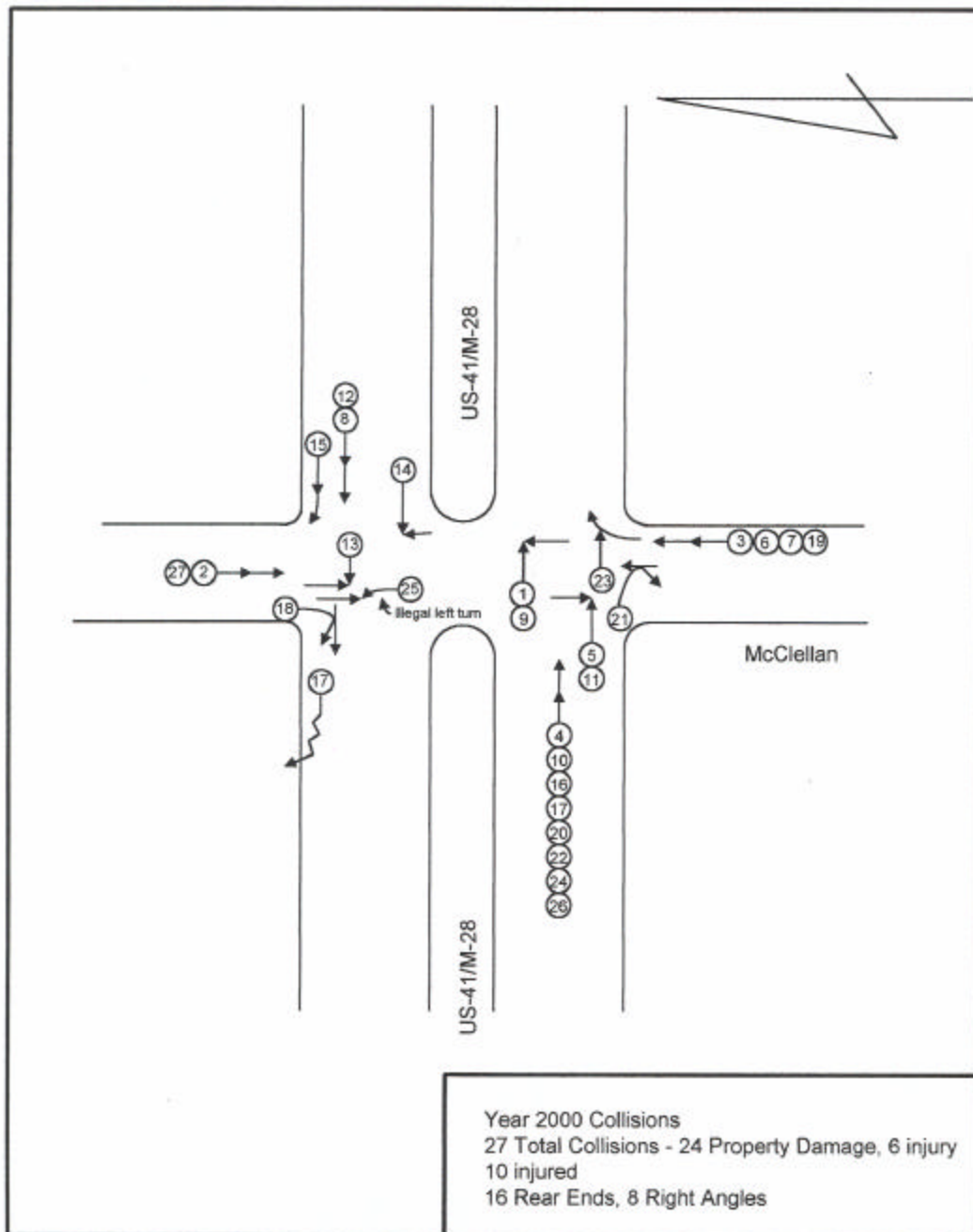
US-41/M-28 at McClellan St.
City of Marquette, Marquette County
Year 2001
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/05	1145	PD	RE	2	E	Icy
2	1/10	1640	PD	RE	2	N	Wet
3	1/18	1645	PD	RERT	2	E	Wet
4	1/19	0925	PD	Angle	2	W-N	Snowy
5	1/21	2030	PD	RE	2	S	Dry
6	2/15	1630	PD	RELT	2	S	Unk
7	2/17	1235	1-C	RE	2	N	Icy
8	2/21	1230	PD	RE	2	E	Icy
9	2/27	1330	PD	RELT	2	S	Wet
10	2/27	1335	1-B	Hd on LT	2	E-W	Wet
11	3/07	2300	1-C	Angle	2	N-E	Slushy
12	3/09	1450	PD	RERT	2	S	Wet
13	3/24	1202	PD	Angle	2	S-W	Wet
14	3/24	1210	1-C	RE	2	N	Wet
15	4/09	2115	PD	RERT	2	E	Dry
16	5/04	1140	PD	RERT	2	E	Dry
17	5/14	1050	PD	RERT	2	W	Dry
18	5/25	1240	1-B, 1-C	Angle	2	S-W	Dry
19	7/13	0900	1-C	Angle	2	S-E	Dry
20	7/16	1735	1-C	RE	2	W	Wet
21	7/27	1545	PD	RERT	2	S	Dry
22	7/30	2300	PD	Angle	2	N-W	Dry
23	8/06	1530	PD	RERT	2	W	Dry
24	8/13	2320	PD	Angle	2	S-W	Dry
25	8/20	1948	3-C	Angle	3	S-E-N	Dry
26	8/20	2200	PD	Angle	2	N-E	Dry
27	9/17	1300	PD	RE	2	W	Dry
28	9/19	1725	PD	RE	2	E	Wet
29	10/20	1905	PD	Angle	2	E-N	Dry
30	11/05	1850	PD	RE	2	N	Dry
31	11/10	1320	PD	Angle	2	S-W	Wet
32	11/23	0130	PD	RERT	2	E	Dry
33	12/15	0916	2-A	Angle	2	E-S	Dry
34	12/15	1830	PD	RERT	2	E	Dry
35	12/26	1600	PD	Angle	2	S-E	Snowy



US-41/M-28 at McClellan St.
City of Marquette, Marquette County
Year 2000
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/13	0843	1-B	Angle	2	N-E	Snowy
2	1/19	1330	PD	RE	2	S	Wet
3	1/24	1240	PD	RE	2	N	Slushy
4	1/31	1510	PD	RE	2	E	Wet
5	2/10	1840	PD	Angle	2	S-E	Snowy
6	3/21	1215	PD	RE	2	N	Wet
7	4/03	1250	PD	RE	2	N	Snowy
8	4/27	1150	PD	RE	2	W	Dry
9	5/07	1605	1-C	Angle	2	N-E	Dry
10	6/10	2010	PD	RE	2	N	Dry
11	7/26	0415	1-B	Angle	2	S-E	Dry
12	8/08	1330	PD	RE	2	W	Wet
13	8/29	0910	1-C	Angle	2	W-S	Dry
14	9/10	0055	PD	Angle	3	W-N	Dry
15	10/11	1150	PD	RERT	2	W	Dry
16	10/14	1330	1-A	RE	2	E	Dry
17	10/28	1630	PD	RE	2	E	Unknown
18	11/03	1715	PD	SSSM	2	W	Dry
19	11/15	1745	PD	RE	2	N	Dry
20	11/16	1800	PD	RE	2	E	Icy
21	11/19	1700	PD	RT Angle	2	E-N	Snowy
22	11/19	1700	PD	RE	2	E	Icy
23	11/25	1515	PD	RT Angle	2	N-E	Dry
24	12/04	1145	PD	RE	2	E	Dry
25	12/16	1515	PD	Hd on LT	2	N-S	Slushy
26	12/20	1610	PD	RE	2	E	Slushy
27	12/24	1545	PD	RE	2	S	Icy



US-41/ M-28 (Front Street), and Genesee Street

The north and south legs of US-41/M-28 (Front Street) are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb and gutter on both sides. There is an asphalt pathway on the east side and a concrete sidewalk on the west side. Front Street transitions to a divided four-lane roadway north of the intersection.

The intersection forms a “T”. The west leg (Genesee Street) has two approach lanes, one lane for left turns and one for right turns. There is an overhead illuminated sign with “Left Arrow Only” legend.

The posted speed limit on Front Street is 35 MPH. The speed limit on the Genesee Street is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase fixed-time traffic signal. There are pedestrian indications for crossing the south and west legs. There is a marked pedestrian crosswalk on the south leg that terminates in a flowerbed beyond the east curb line of Front Street. There is no marked pedestrian crosswalk on the west leg.

There are STOP lines marked on the northbound and southbound approaches, but not on the eastbound approach.

The Harbor Development is currently under construction on the east side of the intersection. The construction driveway is offset approximately 120 feet to the north of Genesee Street. When completed the access road to the new development should be located at the intersection directly across from Genesee Street.

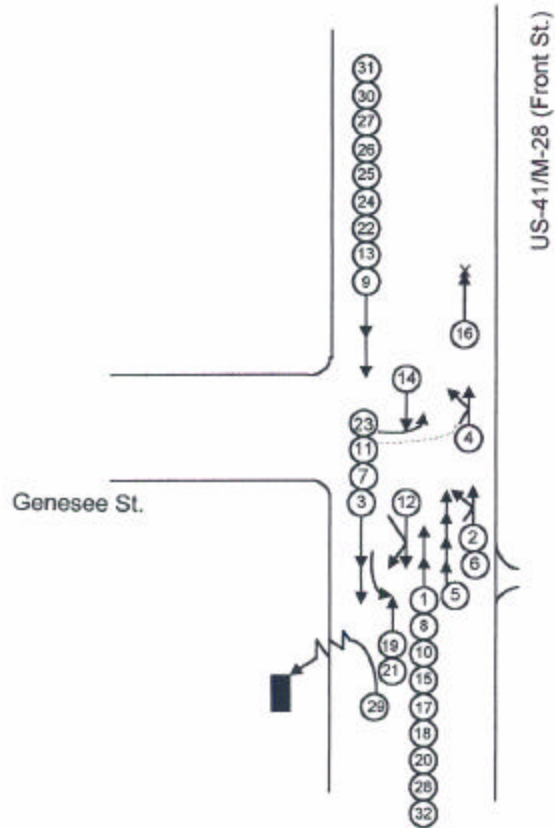
Crash Review Comments

Twenty-three [23] of the 32 collisions were rear end crashes, 18 of these have occurred on the US-41 approaches. Approximately 36% of the rear end crashes occurred on wet/snowy/icy pavement.

Further evaluation of pavement conditions is needed perhaps to improve pavement friction qualities.

US-41/M-28 at Genesee St.
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition	Remarks
1	3/15/00	1200	PD	RE	2	N	Snowy	
2	4/27/00	2245	PD	SS SM	2	N	Dry	
3	8/16/00	1700	PD	RE	2	S	Dry	
4	8/18/00	1250	PD	SS SM	2	N	Dry	
5	9/06/00	0715	PD	RE	4	N	Dry	
6	10/27/00	1515	PD	SS SM	2	N	Dry	
7	11/10/00	1725	PD	RE	2	S	Dry	
8	11/26/00	1530	PD	RE	2	N	Dry	
9	2/01/01	2000	1-C	RE	2	S	Snowy	
10	2/13/01	1600	PD	RE	2	N	Wet	
11	2/15/01	1459	2-C	RE	2	S	Wet	
12	3/14/01	1315	PD	SS SM	2	S	Dry	
13	4/03/01	1500	PD	RE	2	S	Dry	
14	5/12/01	1535	PD	LT Angle	2	E-S	Dry	
15	5/26/01	1151	1 - C	RE	2	N	Wet	
16	6/21/01	1640	PD	Misc	1	N	Dry	
17	6/28/01	1420	PD	RE	2	N	Dry	
18	7/06/01	2025	1-C	RE	2	N	Wet	Raining
19	8/03/01	1320	1-C	Hd on LT	2	S-N	Dry	
20	8/31/01	0830	PD	RE	2	N	Wet	Raining
21	9/26/01	0710	PD	Hd on LT	2	S - N	Dry	
22	10/14/01	1715	1-C	RE	2	S	Dry	
23	11/08/01	1415	PD	RE	2	S	Wet	
24	11/10/01	1445	PD	RE	2	S	Wet	Raining
25	1/06/02	1110	PD	RE	2	S	Snowy	
26	2/22/02	1430	PD	RE	2	S	Wet	
27	3/22/02	0915	PD	RE	2	S	Dry	
28	4/24/02	0850	1-C	RE	2	N	Wet	
29	6/11/02	1206	PD	R O R	1	N	Dry	
30	9/20/02	1750	PD	RE	2	S	Wet	Raining
31	11/05/02	1630	1-A	RE	2	S	Wet	Raining
32	12/10/02	1800	PD	RE	2	N	Wet	



Three years of Collisions - 2000 thru 2002

32 Total Collisions - 24 Property Damage, 8 injury
23 Rear Ends, 12 during wet pavement conditions

US-41/ M-28 and BL-41 (Front Street)

The intersection forms a modified “T” with free flowing right turn movements and channelized left turn movements. The northbound to westbound left turn movement must yield to the eastbound to northbound left turn, even though the traffic volumes are substantially higher. The Champion Street Bridge spans US-41/M-28 on the west side of the intersection.

The northbound approach has two thru lanes and a channelized left turn lane. There is a channelized left turn merge lane on the north side of the intersection. The southbound approach has two travel lanes. The eastbound approach has two lanes, one for left turns and one for right turns.

The speed limit on the north and south legs is 35 MPH. The speed limit on the west leg is 55 MPH.

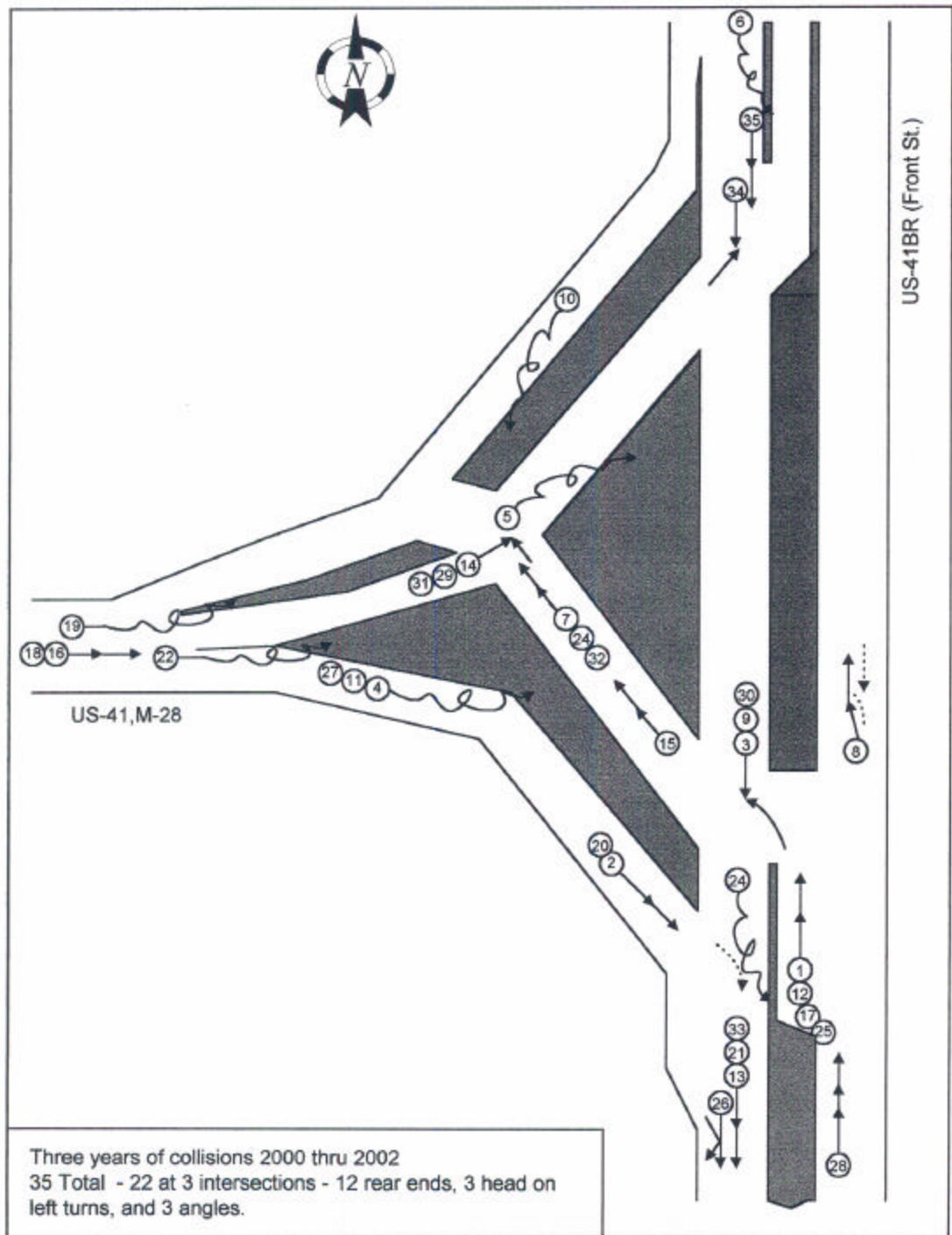
Crash Review Comments

Three [3] of the six [6] conflict points have experienced 22 of the 35 crashes in three [3] years. The conflict points are on the north to westbound lane and the east to southbound lane.

The storage lane of the north to west traffic volume needs to be lengthened and a study of merging lanes needed.

US-41/M-28 at US41BR (Front St.)
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram #	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	1/25/00	0850	PD	RELT	2	N	Snowy
2	2/18/00	1205	PD	RE	2	SE	Wet
3	3/09/00	0940	PD	Hd on LT	2	S-NW	Snowy
4	3/09/00	1600	P1-BD	ROR	1	SE	Icy
5	3/26/00	0415	1-B	ROR	1	NE	Wet
6	4/24/00	0120	PD	ROR	1	S	Dry
7	6/24/00	1300	PD	RE	2	NW	Wet
8	7/07/00	0800	PD	RE	2	N	Dry
9	12/12/00	1900	PD	Hd on LT	2	S-NW	Slushy
10	12/15/00	1050	PD	ROR	1	SW	Snowy
11	12/15/00	2030	PD	ROR	1	SW	Slushy
12	12/27/00	1345	PD	RE	2	N	Icy
13	5/06/01	2010	PD	SSSM	2	S	Dry
14	6/30/01	1420	PD	Angle	2	NE-NW	Dry
15	7/09/01	1215	1-C	RE	2	NW	Dry
16	7/26/01	1845	PD	RE	2	E	Dry
17	9/07/01	1720	PD	RELT	2	N	Wet
18	11/10/01	1320	PD	RE	2	E	Wet
19	1/06/02	1415	PD	ROR	1	E	Icy
20	2/11/02	1655	PD	RE	2	SE	Dry
21	2/21/02	1529	PD	RE	2	S	Wet
22	3/03/02	1030	PD	ROR	1	E	Icy
23	3/09/03	2130	PD	RE	2	NW	Snowy
24	3/17/02	1940	PD	ROR	1	S	Wet
25	4/28/02	1240	PD	RELT	2	N	Wet
26	5/24/02	1340	PD	SSSM	2	S	Dry
27	5/25/02	1400	PD	ROR	1	SE	Wet
28	6/07/02	1444	PD	RE	3	N	Dry
29	6/18/02	1129	PD	Angle	2	NW-NE	Dry
30	6/22/02	1700	PD	Hd on LT	2	S-NW	Dry
31	6/29/02	1615	PD	Angle	2	NW-NE	Dry
32	7/04/02	1215	PD	RE	2	NW	Dry
33	9/11/02	1840	PD	RE	2	E	Dry
34	10/04/02	0715	PD	Angle	2	NE-S	Wet
35	11/25/02	1410	PD	RE	2	S	Slushy



US-41/ M-28 and Grove Street (County Road 500)

The east and west legs of US-41/M-28 are divided four-lane roadways with a channelized left turn lane at the intersection. The left-turn lanes are delineated by “ARROW and ONLY” markings. There are overhead illuminated “LEFT” signs mounted above the left turn traffic signal heads. There are exclusive right turn lanes on both the eastbound and westbound approaches. There are no “RIGHT LANE MUST TURN RIGHT” signs. There is paved shoulder on both sides.

There are two approach lanes on the north and south legs of Grove Street, one lane for thru traffic and one lane for right turns. The northbound and southbound approach lanes are marked with “THRU ARROWS” and “RIGHT ARROWS”, but there are no “ONLY” markings. There are no pavement markings in the median to indicate lane usage.

Left turns are allowed in all directions at the intersection because the median does not have sufficient width to provide median crossovers to accommodate indirect left turns.

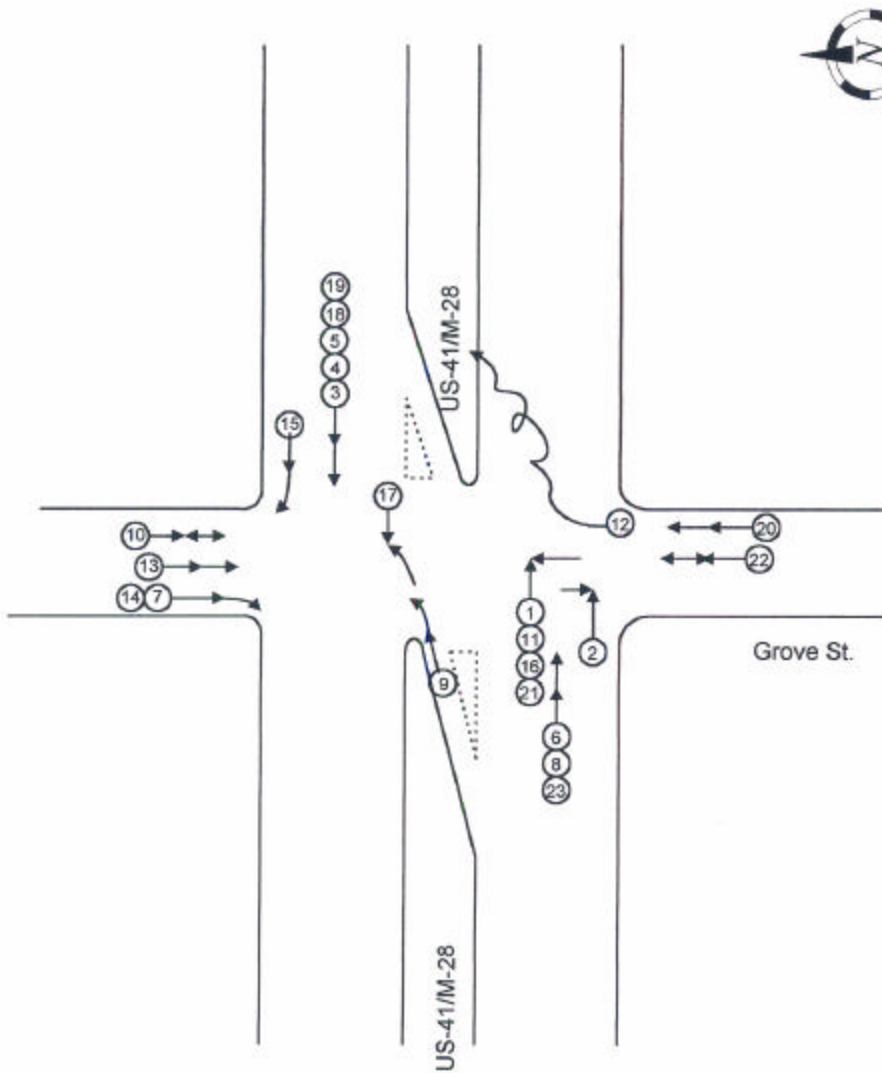
The posted speed limit on US-41/M-28 is 55 MPH. The posted speed limit on south leg of Grove Street is 25 MPH. The speed limit on the north leg is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a three-phase semi-actuated traffic signal. There are detector loops on both the northbound and southbound approaches on Grove Street and in the left turn lanes on US-41/M-28. There is a leading protected left turn phase on US-41/M-28. Left turns are not permitted during the thru phase. (The Signal Timing Permit on file is for a fixed-time signal and therefore does not match the field operation.)

There are no pedestrian indications or marked crosswalks. There are STOP lines on all approaches.

US-41/M-28 at Grove St.
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram #	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	1/31/00	2300	PD	Angle	2	N-E	
2	2/11/01	0945	PD	Angle	2	N-W	
3	3/24/00	1800	PD	RE	2	W	
4	3/31/00	1615	1-C	RE	2	W	
5	4/14/00	1810	1-C	RE	2	E	
6	5/22/00	1750	PD	RE	2	E	
7	9/18/00	0900	PD	RE	2	S	
8	11/20/00	1415	PD	RE	2	E	
9	12/05/00	1510	PD	RELT	2	E	
10	12/30/00	1100	PD	Backing	2	S	
11	12/30/00	1237	1-A, 1-B	Angle	2	N-E	
12	1/31/01	1155	PD	ROR	1	N	
13	2/06/01	1210	PD	RERT	2	S	
14	3/14/01	1205	PD	RE	2	SW	
15	10/01/01	1620	PD	RERT	2	N-E	
16	12/18/01	2305	PD	Angle	2	E-W	
17	12/20/01	1805	1-C	Hd on LT	2	W	
18	4/12/02	1455	PD	RE	2	W	
19	5/26/02	1200	PD	RE	2	N	
20	6/12/02	1315	PD	RE	2	N-E	
21	8/08/02	1225	PD	Angle	2	N	
22	10/30/02	1530	PD	Backing	2	N-E	
23	12/24/02	1520	PD	RE	2	E	



Three years of Collisions - 2000 thru 2002

23 Total Collisions - 19 Property Damage, 4 injury
5 injured
15 Rear Ends, 5 Right Angles

US-41/M-28 at Hampton Street

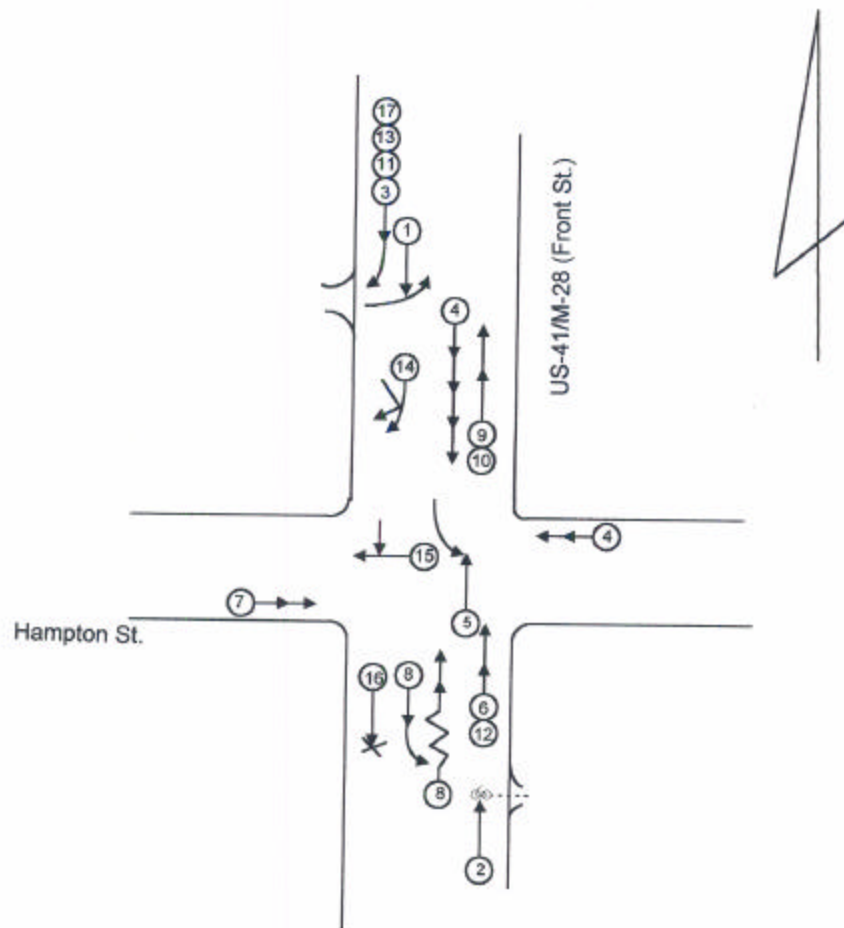
This intersection is approximately 400 feet south of the Genesee Street signal. Hampton Street is controlled by STOP signs in both legs. US-41 operation is similar to Genesee Street description except the north bound US-41 speed changes from 50 MPH to 35 MPH at Furnace Street that is one [1] block south of Hampton Street.

Crash Review Comments

Crash pattern is similar to Genesee Street except this intersection is NOT signalized. However, several [4] collisions occurred at the driveways of a tire center. These driveways should be closed.

US-41/M-28(Front) at Hampton St.
City of Marquette, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement Condition
1	3/11/00	1730	PD	Dr' Rt A	2	S-E	Dry
2	6/25/00	1210	PD	Misc	1	NBd	Dry
3	7/19/00	1640	PD	Dr' RE RT	2	SBd	Dry
4	8/23/00	1900	Unk	RE	4	SBd	Dry
5	11/21/00	0800	Unk	Hd on LT	2	N-S	Wet
6	12/05/00	0930	Unk	RE	2	NBd	Icy
7	12/08/00	1515	PD	RE	2	Ebd	Icy
8	12/18/00	1155	1-C	Dr' RE LT	2	SBd	Slushy
9	1/06/01	0955	1-C	RE	2	NBd	Slushy
10	2/01/01	0715	PD	RE	2	NBd	Wet
11	3/21/01	0750	PD	Dr' RE RT	2	SBd	Wet
12	6/01/01	1000	PD	RE	2	NBd	Wet
13	8/31/01	1348	1-C	Dr' RE RT	2	SBd	Dry
14	3/10/02	1900	PD	SS SM	2	SBd	Icy
15	4/18/02	1725	1-C	Angle	2	S-WBd	Dry
16	8/22/02	2100	PD	Misc	1	SBd	Dry
17	10/24/02	2045	PD	Dr' RE RT	2	SBd	Dry



Three years of Collisions - 2000, 2001 and, 2002

17 Total Collisions - 11 Property Damage, 4 injury
11 Rear Ends - 3 on wet pavement

Marquette Township

Signalized intersections were reviewed as well as adjacent intersections with unique operations.

The signal operation at the WalMart/Target drive was analyzed for existing and future capacity levels [Level of Service {LOS} measures]. Current intersection geometry and laneage will provide satisfactory service in the future when Co. Rd. 492 is re-routed into the north leg of this intersection.

US-41 and Commerce Drive

The intersection of US-41 and Commerce Drive forms a “T” and is controlled by a STOP sign on Commerce Drive. Since the center median on US-41 is closed at this location, all traffic on Commerce Drive must turn right at the intersection. There is a “RIGHT TURN ONLY” sign posted in advance of the intersection. The sign should be relocated and placed below the existing STOP sign at the intersection for greater clarity.

There is a right turn lane on westbound US-41 at the intersection. However it is not marked or signed properly. There are no “ARROW ONLY” pavement markings or “RIGHT LANE MUST TURN RIGHT” signs.

The posted speed limits are 50 MPH on US-41/M-28 and 35 MPH on Commerce Drive. The ADT on Commerce Drive is 1,148 vehicles per day (2001).

Commerce Drive connects to County Road 492 (Wright Road) to the north. There is currently a proposal under consideration to open the median and extend Commerce Drive southward to Brookton Road. Under this proposal the existing traffic signal at US-41/M-28 at Westwood Mall (Kohl’s) would be removed and a new signal installed at Commerce Drive. This in effect would provide a direct route for straight-thru traffic on County Road 492.

Currently there are median crossovers on US-41/M-28 to the east and west of Commerce Drive. A decision must be made as to whether left turns will be permitted at the new signalized intersection or directed to the median crossovers. The median left turn lanes are currently formed opposite Commerce Drive. The location of the existing median crossovers does not meet the MDOT standard of placing crossovers 600 feet distant from a signalized intersection.

Commerce Drive is 36 feet wide (from edge of pavement). If two approach lanes are to be provided to operate under traffic signal control, the road must be widened.

US-41/M-28 at Median Cross-over at Westwood Mall (Kohl’s)

The intersection of US-41/M-28 and the median cross-over at the Westwood Mall (Kohl’s) entrance-exit driveway is controlled by a semi-actuated two-phase traffic signal.

The signal operates on an 80-second background cycle to maintain co-ordination with the traffic signal at Target Drive-Wal-Mart.

The median cross-over on US-41 services the left turn movement from eastbound US-41 into the mall entrance. The median cross-over also services the U-turn maneuver from eastbound US-41 to westbound. Heavy commercial vehicles when conducting a U-turn comes very close to vehicles queued at the southbound STOP line.

There is a right turn lane on westbound US-41 at the intersection. The right turn lane is marked with "Arrow Only" but not signed.

The mall driveway is divided by a center median. The twenty-two foot wide southbound mall exit operates as two approach lanes to the intersection. However there are no lane line markings only marked detector loops.

All traffic exiting the mall must turn right. Right turn green arrow (RTGA) indications are displayed to the northbound approach. A circular green indication is displayed simultaneously to southbound cross-over traffic. According to the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), "A steady GREEN ARROW indication shall be used only to allow vehicular movements which are completely protected from conflict with other vehicles moving on a green or yellow indication..." Since U-turns on US-41 may be conducted when a RTGA is displayed to traffic exiting the mall, the traffic signal operation is in violation of the standards set forth in MMUTCD. Therefore the right arrow signal indications should be replaced with circular indications.

The ADT on the mall entrance-exit driveway is 4285 vehicles per day (2001).

US-41/M-28 and County Road 492 (Wright Street)

The intersection of US-41 and County Road 492 (Wright Street) is controlled by STOP signs on County Road 492. There is a median cross-over on eastbound US-41 to service the left turn movement from eastbound to northbound. Therefore all traffic on the northbound and southbound approaches must turn right at the intersection. Northbound and southbound straight-thru traffic on County Road 492 is **NOT** permitted at the intersection. Northbound approach traffic with travel destination to the north or west must use the median cross-over located 1200 feet to the east of the intersection (i.e. at the Westwood Mall entrance). Similarly southbound approach traffic with travel destination to the south or east must use the median cross-over located 1300 feet to the west of the intersection. Therefore the total adverse travel for each indirect movement is nearly one-half mile distance.

The southbound County Road 492 approached is marked as two lanes. However southbound traffic queues in the right lane only and does not utilize the second (left) lane.

There are right turn lanes on both the eastbound and westbound US-41/M-28 approaches to the intersection. However neither right turn lane is signed or marked.

The posted speed limit on Wright Road is 45 MPH.

Crash Review Comments

Two-year crash summary indicates mostly rear end collisions. The geometrics of median crossover are substandard and it should be closed.

US-41/M-28 and Target Drive-Wal-Mart

The intersection of US-41/M-28 and Target Drive-Wal-Mart driveway serves as the primary access points to the Wal-Mart store located on the south side of US-41 and the Target store located on the north side. The intersection is controlled by a six-phase actuated traffic signal. There are left turn green arrow (LTGA) indications on both the eastbound and westbound approaches on US-41. There are right turn green arrow (RTGA) indications on both the northbound and southbound approaches which are displayed concurrently with the LTGA indications. The left turn phase operates as a leading protected phase. Left turns are not permitted on the thru green indication. The signal operates on an 80-second background cycle.

The westbound US-41 approach to the intersection has four lanes; one lane for left turns, two lanes for thru traffic, and one lane for right turns. The eastbound approach has three lanes including one lane for left turns. Both the northbound and southbound approaches to the intersection have three lanes; one lane for left turns, one lane for thru traffic, and one lane for right turns.

The westbound US-41 right lane is signed as “RIGHT LANE MUST TURN RIGHT”. However there are no “Arrow and Only” markings on the pavement.

The westbound US-41 left turn lane is delineated with “ARROW ONLY” pavement markings, but there are no “LEFT LANE MUST TURN LEFT” signs. The speed limit on US-41/M-28 transitions to 55 MPH west of the intersection.

The ADT on Target Drive is 2,808 vehicles per day (2002).

US-41/M-28 and Erickson Avenue

This is a mid-block location where Erickson Avenue forms a "T" intersection with US-41. A directional crossover is located directly across from Erickson Avenue for eastbound traffic. Erickson Avenue is controlled by a STOP sign.

Crash Review Comments

Twenty-three [23] crashes occurred at this intersection in the last two [2] years [2001 & 2003]. Half of the crashes were angle collisions, attempting a left turn via the media opening. Thirteen [13] of the crashes were on wet/snowy pavement. There is notable problem with driveway related crashes.

US-41/M-28 at Erickson St.
Marquette Twp., Marquette County
Years 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	1/07/01	1105	PD	R O R	1	W	Snowy
2	1/24/01	1640	1-C, 1-B	Angle	2	S-W	Wet pavement
3	2/05/01	1218	PD	SS SM	2	W	
4	4/07/01	1440	PD	SS SM*	2	S	Wet pavement
5	4/24/01	1000	PD	R O R	1	Unk	Wet pavement
6	8/20/01	1420	PD	Angle	2	S-W	
7	9/25/01	0809	PD	Misc	1	W	
8	11/17/01	1907	PD	Misc	1	SE	
9	11/27/01	0840	PD	RE	2	W	Snowy
10	1/31/02	1435	PD	Angle	2	S-W	
11	2/01/02	2035	PD	RE	2	S	Icy pavement
12	2/13/02	1310	1-C	Angle*	2	S-E	Wet pavement
13	3/20/02	0345	1-B	RE RT*	2	W	Wet pavement
14	5/01/02	1530	PD	Angle RT*	2	S - W	
15	5/08/02	1705	PD	SS SM	2	S	Wet pavement
16	6/02/02	1430	PD	SS SM	2	N	
17	6/03/02	1650	PD	Angle	2	S-W	
18	7/30/02	0940	1-A, 1-C	LT Angle	2	S-E	
19	8/09/02	2210	PD	RE	2	W	
20	8/20/02	1720	PD	Angle*	2	S-W	Wet pavement
21	11/21/02	1031	PD	RE RT*	2	W	Wet pavement
22	12/06/02	1602	2-C	Angle	2	S-W	Wet pavement
23	12/23/02	1450	PD	SS SM	2	S	Wet pavement

* collisions of motorists using driveways

City of Negaunee

Signalized intersection locations on US-41/M-28 with crash summaries and collision diagrams for the years 2000, 2001 & 2002.

US-41/M-28 @ Maas	Operational review only
US-41/M-28 @ Baldwin	Operational review and crash analysis; 18 crashes in three [3] years.
US-41/M-28 @ Teal Lake/Croix	Operational review only

US-41/ M-28 and Mass Street

The east and west legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The north and south legs of Mass Street has two approach lanes, including a short 60-foot long left turn lane. The approach lanes are delineated with “ARROWS and ONLY” pavement markings and lane usage signs.

The posted speed limit on US-41/M-28 is 45 MPH. The posted speed limit on the south leg of Mass Street is 25 MPH. The speed limit on the north leg is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase semi-actuated traffic signal. There are detector loops on the north and south approaches of Mass Street delineated with white paint. There are pedestrian indications on all four legs. There are push buttons available for crossing US-41/M-28. There are no marked pedestrian crosswalks.

There are STOP lines marked on all approaches.

US-41/ M-28 and Baldwin Avenue

The east and west legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The north and south legs of Baldwin Avenue has two approach lanes, including a short 80-foot long left turn lane on the north leg and a 100-foot long left turn lane on the south leg. The approach lanes are delineated by faded lane lines. There are no “ARROWS and ONLY” pavement markings. However there is side mounted lane usage signs and overhead illuminated signs with “Left Arrow Only” legend at the intersection.

The posted speed limit on US-41/M-28 is 45 MPH. The speed limit on the Baldwin Avenue is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase semi-actuated traffic signal. There are detector loops on the north and south approaches of Baldwin Avenue delineated with white paint. There are pedestrian indications on all four legs. There are push buttons available for crossing US-41/M-28. There are marked pedestrian crosswalks on the east and west legs only.

There are STOP lines marked on all approaches. However the STOP lines on the north and south legs of Baldwin Avenue are faded.

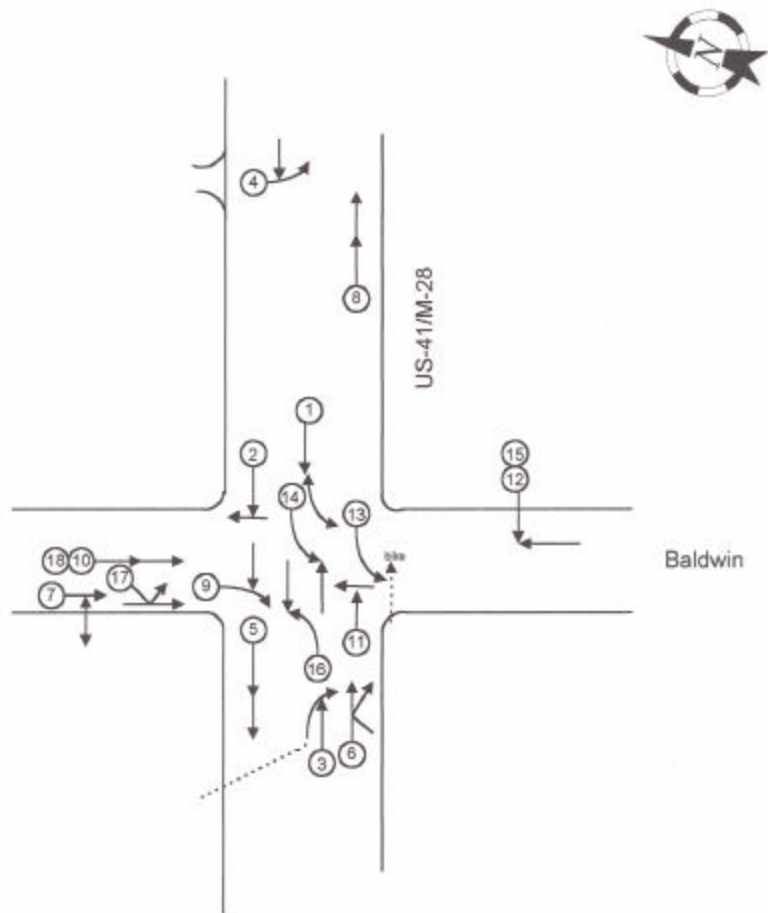
Crash Review Comments

Eighteen [18] of the crashes were angle collisions. The turning movements at this intersection should be studied further.

US-41/M-28 at Baldwin St.
City of Negaunee, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	3/03/00	1715	PD	Backing	2	WBd	
2	6/09/00	2021	PD	Angle	2	N-WBd	
3	2/04/01	0939	PD	RT Angle	2	S-Ebd	Snow
4	4/27/01	1530	PD	LT Angle	2	S-WBd	250ft E. of Baldwin
5	6/28/01	1740	PD	RE	2	WBd	Const Zone
6	8/08/01	1331	PD	SS SM	2	Ebd	
7	9/07/01	1750	PD	Backing	2	S-WBd	Wet pavement
8	10/16/01	1650	PD	RE	2	Ebd	
9	10/25/01	1402	PD	RT Angle	2	S-WBd	Wet pavement
10	2/26/02	1725	PD	RE	2	SBd	Snow
11	4/09/02	1730	PD	Angle	2	N-Ebd	
12	4/26/02	1600	1-C	Angle	2	N-WBd	Driveway-
13	5/22/02	1730	1-B	LT Bike	1	W-Ebd	
14	7/06/02	1849	2-C's	Hd on LT	2	W-Ebd	
15	7/13/02	1035	PD	Angle	2	N-WBd	Driveway-
16	7/16/02	1449	1-C	Hd on LT	2	E-WBd	
17*	2/16/01	10-11A	PD	SS SM	2	SBd	
18*	2/26/02	5-6P	PD	RE	2	SBd	

* = Drawn from the MDOT General Crash Program - one line listing



Three years of Collisions - 2000 thru 2002

18 Total Collisions - 14 Property Damage,
4 injury - 6 injured

US-41/ M-28 and Teal Lake Avenue (BL-28)/Croix Street

The east leg of US-41/M-28 is a five-lane roadway with center lane for left turn. The center left-turn lane is delineated by “ARROW and ONLY” markings with solid yellow-skip yellow lane lines. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The west leg of US-41/M-28 is undivided four-lanes with a marked 100-foot long left turn pocket at the intersection. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is a paved shoulder on both sides.

The south leg (Teal Lake Avenue) has two approach lanes including a 120-foot long left turn lane. The approach lanes are delineated by “ARROWS and ONLY” pavement marking and side mounted lane usage signs. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection.

The north leg (Croix Street) has two approach lanes including a short 90-foot long left turn lane. The approach lanes are delineated by “ARROWS and ONLY” pavement marking and side mounted lane usage signs. The thru-right option pavement marking in the right lane is faded.

The posted speed limit on US-41/M-28 is 45 MPH. The speed limit transitions to 55 MPH west of the intersection. The posted speed limit on both Teal Lake Avenue and Croix Street is 25 MPH.

The intersection is controlled by a two-phase fixed-time traffic signal. There are pedestrian indications on east and south legs. There is a marked pedestrian crosswalk on the east leg but not on the south leg.

There are STOP lines marked on all approaches.

City of Ishpeming

Signalized intersection locations with crash summaries and collision diagrams for the years 2000, 2001 & 2002.

Crash Totals

US-41/M-28 @ Second St./Deer Lake	30
US-41/M-28 @ Lakeshore Drive	40

US-41/ M-28 and Second Street

The east leg of US-41/M-28 is a five-lane roadway with center lane for left turn. An “ARROW” marking with solid yellow-skip yellow lane lines delineates the center left-turn lane. There is no corresponding “ONLY” marking. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is curb, gutter, and an asphalt pathway on both sides.

The west leg of US-41/M-28 is five lanes with a marked 125-foot long left turn pocket marked at the intersection. There is an “ARROW” pavement marking but no corresponding “ONLY” marking. There is an overhead illuminated sign with “Left Arrow Only” legend at the intersection. There is a paved shoulder on both sides.

The north and south legs of Second Street has two approach lanes, including a short 90-foot long left turn lane on the north leg and a 70-foot long left turn lane on the south leg. There are “ARROW” markings in the left turn lanes but no corresponding “ONLY” markings. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection.

The posted speed limit on US-41/M-28 is 45 MPH. The speed limit transitions to 55 MPH west of the intersection. The posted speed limit on north leg of Second Street is 25 MPH. The speed limit on the south leg of Second Street is not posted and is thereby 25 MPH by State statute.

The intersection is controlled by a two-phase fixed-time traffic signal. There are no pedestrian indications.

There are no marked pedestrian crosswalks.

There are STOP lines marked on all approaches.

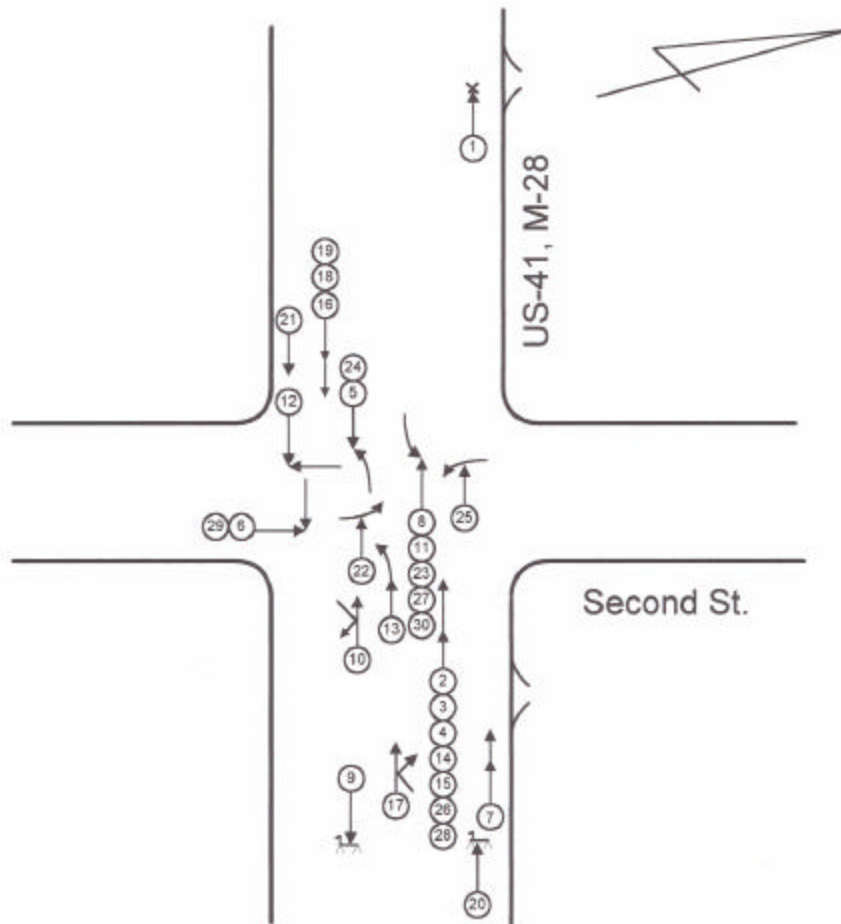
Crash Review Comments

Fifty percent [50%] of the crashes were angle collisions. The signal timing and overall operation should be evaluated for providing safer turning opportunities.

US-41/M-28 at Second St.
City of Ishpeming, Marquette County
Years 2000, 2001 & 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Pavement condition
1*	1/17/00	9-10P	PD	Misc	1	WBd	Snowy
2	1/22/00	1758	PD	RE	2	EBd	Icy
3*	2/13/00	5-6P	PD	RE	2	WBd	Icy
4*	2/26/00	3-4P	1-C	RE	2	WBd	Wet
5*	7/01/00	4-5P	PD	Hd on LT	2	W-EBd	Dry
6*	7/22/00	4-5P	1-C	Angle	2	N-EBd	Dry
7*	9/24/00	N-1P	1-C	Drive RE	2	WBd	Dry
8*	10/06/00	11A-N	1-A, 1-B	Hd on LT	2	E-WBd	Dry
9*	10/27/00	11P-M	PD	Deer	1	Ebd	Dry
10*	11/19/00	5-6P	PD	SSOP	2	W-Ebd	Icy
11*	12/08/00	4-5P	2-C	Hd on LT	2	W-Ebd	Slushy
12	1/07/01	0110	1-C	Angle	2	E-SBd	Snowy
13	1/14/01	1755	PD	RELT	2	Ebd	Snowy
14	2/09/01	1039	1-C	RE	2	WBd	Snowy
15	2/22/01	0853	PD	RE	2	WBd	Icy
16	3/05/01	0915	1-C	RE	2	Ebd	Snowy
17	3/19/01	1710	PD	RELT	2	WBd	Dry
18	4/04/01	1135	PD	RE	2	WBd	Dry
19	5/11/01	0745	PD	RE	2	Ebd	Dry
20*	5/23/01	2-3A	PD	Deer	1	WBd	Dry
21	7/23/01	0630	1-A	Misc	1	Ebd	Unknown
22	8/21/01	1935	1-C	Angle	2	N-WBd	Dry
23	8/25/01	1500	PD	Hd on LT	2	E-WBd	Wet
24	9/14/01	2040	PD	Hd on LT	2	E-WBd	Dry
25	3/28/02	0600	PD	Angle	2	S-WBd	Dry
26	7/07/02	1910	PD	RE	2	WBd	Wet
27	9/09/02	1619	2-B's	Hd on LT	2	E-WBd	Dry
28	10/20/02	1315	PD	RE	2	WBd	Wet
29*	12/17/02	8-9A	PD	Angle	2	N-Ebd	Dry
30	12/20/02	1441	PD	Hd on LT	2	E-WBd	Wet

* = Data from MDOT General Crash Program



Three years of Collisions

30 Total - 19 Property Damage, 11 injury- 14 injured
12 Rear ends, 7 Head on Left Turns, & 5 angles

US-41/ M-28 and Lakeshore Drive (BL-28)

The east and west legs of US-41/M-28 are five-lane roadways with center lane for left turn. The center left-turn lanes are delineated by “ARROW and ONLY” markings with solid white lane lines. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. There are right turn pockets in both directions. However there are no pavement markings in the right turn lanes or complementary lane use signs. There is a paved shoulder on both sides.

The north and south legs of Lakeshore Drive has two approach lanes, including a 100-foot long left turn lane on the north leg and a short 60-foot long left turn lane on the south leg. There are “ARROW and ONLY” markings in the left turn lanes and corresponding lane use signs. There are overhead illuminated signs with “Left Arrow Only” legend at the intersection. The centerline on the north leg has faded away. The south leg of Lakeshore Drive (BL-28) serves as a grand entrance into the City of Ishpeming.

The posted speed limit on US-41/M-28 is 55 MPH. The posted speed limit on north leg of Lakeshore Drive is 25 MPH. The posted speed limit on the south leg of Lakeshore Drive (BL-28) is 35 MPH.

The intersection is controlled by a two-phase fixed-time traffic signal. There are no pedestrian indications.

There are no marked pedestrian crosswalks.

There are STOP lines marked on all approaches.

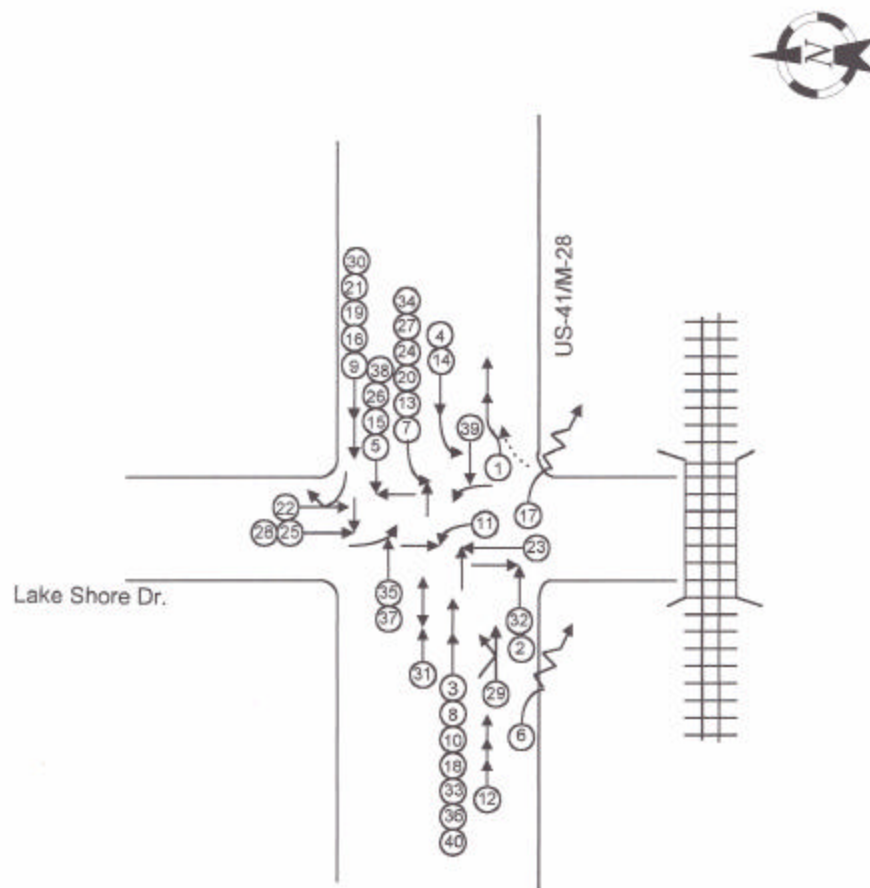
Crash Review Comments

This is the third highest crash concentration in the Study Area [and in Marquette County]. The types of collisions indicate a problem with signal timing i.e. providing safer left turn opportunities.

Twenty-one of the 40 crashes were angle collisions. Twelve of those included multiple injuries.

US-41/M-28 at Lake Shore Dr.
City of Ishpeming, Marquette County
Years 2000 thru 2002
Collisions Supplement Sheet

Diagram Number	Date	Time	Severity	Type	# of vehicles	Direction of travel	Remarks
1	2/04/00	1900	PD	SS+RE	3	E	Wet Pavement
2	2/07/00	1540	PD	Angle	2	S-E	
3	2/13/00	1035	PD	RE	2	E	Snowy
4	2/16/00	1920	PD	RELT	2	W	Wet Pavement
5	3/04/00	0823	1-B, 1-C	Angle	2	N-W	
6	3/15/00	2015	PD	ROR	1	E	Wet Pavement
7	4/30/00	1720	1-C	Hd on LT	2	E-W	
8	8/26/00	0625	1-B, 1-C	RE	2	E	Wet Pavement
9	9/02/00	1710	PD	RE	2	W	
10	10/12/00	1803	3-C	RE	2	E	
11	10/19/00	1544	PD	Hd on LT	2	N-S	
12	11/07/00	1841	PD	RE	3	E	
13	11/10/00	2145	PD	Hd on LT	2	E-W	
14	3/05/01	1700	PD	RE LT	2	W	Snowy
15	3/30/01	1604	2-B, 1-C	Angle	2	N-W	
16	4/04/01	1558	2-B, 1-C	RE	2	WBd	
17	6/01/01	1805	PD	R O R	1	E	
18	6/10/01	1555	1-C	RE	2	E	Wet pavement
19	8/24/01	1640	PD	RE	2	W	
20	9/28/01	1538	PD	Hd on LT	2	E-W	
21	10/29/01	1202	4-C	RE	3	W	
22	11/26/01	2000	PD	RT	2	W-S	Snowy
23	12/23/01	1225	PD	Angle	2	N-E	Icy
24	2/23/02	1935	PD	Hd on LT	2	W-E	Wet pavement
25	3/16/02	1655	1-B, 1-C	Angle	3	S-W	
26	4/12/02	2355	2-A, 3-C	Angle	2	N-W	
27	4/24/02	1652	2-C	Hd on LT	2	E-W	wet pavement
28	5/03/02	1819	PD	Angle	2	S-W	
29	5/21/02	0750	PD	SS SM	2	E	
30	7/12/02	1610	PD	RE	2	W	
31	7/28/02	1550	PD	Backing	2	E	
32	9/29/02	1307	1-C	Angle	2	S-E	
33	11/12/02	1140	1-C	RE	2	E	
34	12/01/02	2056	PD	Hd on LT	2	E-W	Snowy
35	12/02/02	1836	1-C	Angle LT	2	S-E	93 yr old driver
36	12/05/01	2-3P	1-C	RE	2	E	
37	10/25/01	11-N	1-F, 1-C	LT Angle	2	S-E	
38	5/12/01	6-7A	1-C	Angle	2	N-W	
39	2/17/01	2-3P	1-B	LT Angle	2	N-W	
40	1/26/01	8-9P	PD	Drive RE	2	E	Snowy



Three years of Collisions - 2000 thru 2002

40 Total Collisions -
 22 Property Damage, 18 injury - 35 injured 1 Fatal
 12 Right Angles, 16 Rear Ends, 7 Head on Left Turns

CRASH CONCENTRATIONS
in the US-41/M-28 Corridor
Marquette County, MI
Years 2000, 2001 & 2002

Location	# of Crashes
1. Washington St. City of Marquette	97
2. McClellan City of Marquette	81
3. Lakeshore Drive City of Ishpeming	40
4. Front St. City of Marquette	35
5. Genesee City of Marquette	32
6. Second St./Deer Lake City of Ishpeming	30
7. Grove City of Marquette	23
8. M-28 Junction and Cherry Creek Rd. Chocolay Township	23
9. Silver Creek Road Chocolay Township	21
10. Baldwin City of Negaunee	18
11. Hampton City of Marquette	17